SEQUENCE LISTING

<110> Max-Delbrück-Centrum für Molekulare Medizin

<120> Novel Sequence Variants of the Human Beta 2-Adrenergic Receptor Gene and Use Thereof

<130> Ref. 101195-2

<140> Ser. No. 09/582,719
<141> 2000-06-29

<150> DE 197 58 401.2
<151> 1997-12-30

<150> PCT/DE98/03818
<151> 1998-12-30

<160> 7

<170> PatentIn Ver. 2.1

<210> 1
<211> 3451
<212> DNA
<213> human genomic clone

<220>
<221> mutation
<222> (1)..(3451)
<223> variant of the human beta2-adrenergic receptor gene with mutations in positions 159,245,565,934,1120,1221,1541,1568,1633,1666,1839,2078,2110,2640,2826

<400> 1
cccgggttca agagattctc ctgtctcagc ctcccgagta gctgggacta caggtacgtg 60
ccaccacacc tggctaattt ttgtattttt agtagagaca agagttacac catattggcc 120
aggatctttt gctttctata gcttcaaaat gttcttaaag ttaagacatt cttaatactc 180
tgaaccatat gaatttgcca ttttggtaag tcacagacgc cagatggtgg caatttcaca 240
tggcgcaacc cgaaagatta acaaactatc cagcagatga aaggattttt tttagtttca 300
ttgggtttac tgaagaaatt gtttgaattc tcattgcatc tccagttcaa cagataatga 360
gtgagtgatg ccacactctc aagagttaaa aacaaaacaa caaaaaaatt aaaacaaaag 420
cacacaactt tctctctctg tcccaaaata catacttgca tacccccgct ccagataaaa 480
tccaaagggt aaaactgtct tcatgcctgc aaattcctaa ggagggcacc taaagtactt 540
gacagcgagt gtgctgagga aatcagcagc tgttgaagtc acctcctgtg ctcttgccaa 600
atgtttgaaa gggaatacac tgggttaccg ggtgtatgtt gggaggggag cattatcagt 660
gctcgggtga ggcaagttcg gagtacccag atggagacat ccgtgtctgt gtcgctctgg 720

atgcctccaa gccagcgtgt gtttactttc tgtgtgtgtc accatgtctt tgtgcttctg 780
ggtgcttctg tgtttgtttc tggccgcgtt tctgtgttgg acaggggtga ctttgtgccg 840
gatggcttct gtgtgagagc gcgcgcgagt gtgcatgtcg gtgagctggg agggtgtgtc 900
tcagtgtcta tggctgtggt tcggtataag tctaagcatg tctgccaggg tgtatttgtg 960
cctgtatgtg cgtgcctcgg tgggcactct cgtttccttc cgaatgtggg gcagtgccgg 1020
tgtgctgccc tctgccttga gacctcaagc cgcgcaggcg cccagggcag gcaggtagcg 1080
gccacagaag agccaaaagc tcccgggttg gctggtaagc acaccacctc cagctttagc 1140
cctctggggc cagccagggt agccgggaag cagtggtggc ccgccctcca gggagcagtt 1200
gggccccgcc cgggccagcc tcaggagaag gagggcgagg ggaggggagg gaaaggggag 1260
gagtgcctcg ccccttcgcg gctgccggcg tgccattggc cgaaagttcc cgtacgtcac 1320
ggcgagggca gttcccctaa agtcctgtgc acataacggg cagaacgcac tgcgaagcgg 1380
cttcttcaga gcacgggctg gaactggcag gcaccgcgag cccctagcac ccgacaagct 1440
gagtgtgcag gacgagtccc caccacaccc acaccacagc cgctgaatga ggcttccagg 1500
cgtccgctcg cggcccgcag agccccgccg tgggtccgcc tgctgaggcg cccccagcca 1560
gtgcgctcac ctgccagact gcgcgccatg gggcaacccg ggaacggcag cgccttcttg 1620
ctggcaccca atggaagcca tgcgccggac cacgacgtca cgcaggaaag ggacgaggtg 1680
tgggtggtgg gcatgggcat cgtcatgtct ctcatcgtcc tggccatcgt gtttggcaat 1740
gtgctggtca tcacagccat tgccaagttc gagcgtctgc agacggtcac caactacttc 1800
atcacttcac tggcctgtgc tgatctggtc atgggcctag cagtggtgcc ctttggggcc 1860
gcccatattc ttatgaaaat gtggactttt ggcaacttct ggtgcgagtt ttggacttcc 1920
attgatgtgc tgtgcgtcac ggccagcatt gagaccctgt gcgtgatcgc agtggatcgc 1980
tactttgcca ttacttcacc tttcaagtac cagagcctgc tgaccaagaa taaggcccgg 2040
gtgatcattc tgatggtgtg gattgtgtca ggccttatct ccttcttgcc cattcagatg 2100
cactggtaca gggccaccca ccaggaagcc atcaactgct atgccaatga gacctgctgt 2160
gacttcttca cgaaccaagc ctatgccatt gcctcttcca tcgtgtcctt ctacgttccc 2220
ctggtgatca tggtcttcgt ctactccagg gtctttcagg aggccaaaag gcagctccag 2280
aagattgaca aatctgaggg ccgcttccat gtccagaacc ttagccaggt ggagcaggat 2340
gggcggacgg ggcatggact ccgcagatct tccaagttct gcttgaagga gcacaaagcc 2400
ctcaagacgt taggcatcat catgggcact ttcaccctct gctggctgcc cttcttcatc 2460
gttaacattg tgcatgtgat ccaggataac ctcatccgta aggaagttta catcctccta 2520
aattggatag gctatgtcaa ttctggtttc aatcccctta tctactgccg gagcccagat 2580
ttcaggattg ccttccagga gcttctgtgc ctgcgcaggt cttctttgaa ggcctatggc 2640
aatggctact ccagcaacgg caacacaggg gagcagagtg gatatcacgt ggaacaggag 2700
aaagaaaata aactgctgtg tgaagacctc ccaggcacgg aagactttgt gggccatcaa 2760
ggtactgtgc ctagcgataa cattgattca caagggagga attgtagtac aaatgactca 2820
ctgctataaa gcagtttttc tacttttaaa gacccccccc cccccaacag aacactaaac 2880
agactattta acttgagggt aataaactta gaataaaatt gtaaaaattg tatagagata 2940
tgcagaagga agggcatcct tctgcctttt ttatttttt aagctgtaaa aagagagaaa 3000
acttatttga gtgattattt gttatttgta cagttcagtt cctctttgca tggaatttgt 3060
aagtttatgt ctaaagagct ttagtcctag aggacctgag tctgctatat tttcatgact 3120
tttccatgta tctacctcac tattcaagta ttaggggtaa tatattgctg ctggtaattt 3180
gtatctgaag gagattttcc ttcctacacc cttggacttg aggattttga gtatctcgga 3240
cctttcagct gtgaacatgg actcttcccc cactcctctt atttgctcac acggggtatt 3300
ttaggcaggg atttgaggag cagcttcagt tgttttcccg agcaaaggtc taaagtttac 3360
agtaaataaa atgtttgacc atgccttcat tgcacctgtt tgtccaaaac cccttgactg 3420
gagtgctgtt gcctcccccа ctggaaaccg c 3451

<210> 2
<211> 3451
<212> DNA
<213> human genomic clone

<220>
<221> mutation
<222> (1)..(3451)
<223> variant of the human beta2-adrenergic receptor
gene with mutations in positions 1541,1633,1666

<400> 2
cccgggttca agagattctc ctgtctcagc ctcccgagta gctgggacta caggtacgtg 60
ccaccacacc tggctaattt ttgtattttt agtagagaca agagttacac catattggcc 120
aggatctttt gctttctata gcttcaaaat gttcttaatg ttaagacatt cttaatactc 180
tgaaccatat gaatttgcca ttttggtaag tcacagacgc cagatggtgg caatttcaca 240
tggcacaacc cgaaagatta acaaactatc cagcagatga aaggattttt tttagtttca 300
ttgggtttac tgaagaaatt gtttgaattc tcattgcatc tccagttcaa cagataatga 360
gtgagtgatg ccacactctc aagagttaaa aacaaaacaa caaaaaaatt aaaacaaaag 420
cacacaactt tctctctctg tcccaaaata catacttgca taccccgct ccagataaaa 480
tccaaagggt aaaactgtct tcatgcctgc aaattcctaa ggagggcacc taaagtactt 540
gacagcgagt gtgctgagga aatcggcagc tgttgaagtc acctcctgtg ctcttgccaa 600
atgtttgaaa gggaatacac tgggttaccg ggtgtatgtt gggaggggag cattatcagt 660
gctcgggtga ggcaagttcg gagtacccag atggagacat ccgtgtctgt gtcgctctgg 720
atgcctccaa gccagcgtgt gtttactttc tgtgtgtgtc accatgtctt tgtgcttctg 780
ggtgcttctg tgtttgtttc tggccgcgtt tctgtgttgg acaggggtga ctttgtgccg 840
gatggcttct gtgtgagagc gcgcgcgagt gtgcatgtcg gtgagctggg agggtgtgtc 900
tcagtgtcta tggctgtggt tcggtataag tctgagcatg tctgccaggg tgtatttgtg 960
cctgtatgtg cgtgcctcgg tgggcactct cgtttccttc cgaatgtggg gcagtgccgg 1020
tgtgctgccc tctgccttga gacctcaagc cgcgcaggcg cccagggcag gcaggtagcg 1080
gccacagaag agccaaaagc tcccgggttg gctggtaagg acaccacctc cagctttagc 1140
cctctggggc cagccagggt agccgggaag cagtggtggc ccgccctcca gggagcagtt 1200
gggccccgcc cgggccagcc ccaggagaag gagggcgagg ggaggggagg gaaaggggag 1260
gagtgcctcg ccccttcgcg gctgccggcg tgccattggc cgaaagttcc cgtacgtcac 1320
ggcgagggca gttcccctaa agtcctgtgc acataacggg cagaacgcac tgcgaagcgg 1380
cttcttcaga gcacgggctg gaactggcag gcaccgcgag cccctagcac ccgacaagct 1440
gagtgtgcag gacgagtccc caccacaccc acaccacagc cgctgaatga ggcttccagg 1500
cgtccgctcg cggcccgcag agccccgccg tgggtccgcc tgctgaggcg cccccagcca 1560
gtgcgcttac ctgccagact gcgcgccatg gggcaacccg ggaacggcag cgccttcttg 1620
ctggcaccca atagaagcca tgcgccggac cacgacgtca cgcagcaaag ggacgaggtg 1680
tgggtggtgg gcatgggcat cgtcatgtct ctcatcgtcc tggccatcgt gtttggcaat 1740
gtgctggtca tcacagccat tgccaagttc gagcgtctgc agacggtcac caactacttc 1800
atcacttcac tggcctgtgc tgatctggtc atgggcctgg cagtggtgcc ctttggggcc 1860
gcccatattc ttatgaaaat gtggactttt ggcaacttct ggtgcgagtt ttggacttcc 1920
attgatgtgc tgtgcgtcac ggccagcatt gagaccctgt gcgtgatcgc agtggatcgc 1980
tactttgcca ttacttcacc tttcaagtac cagagcctgc tgaccaagaa taaggcccgg 2040
gtgatcattc tgatggtgtg gattgtgtca ggccttacct ccttcttgcc cattcagatg 2100
cactggtacc gggccaccca ccaggaagcc atcaactgct atgccaatga gacctgctgt 2160

gacttcttca cgaaccaagc ctatgccatt gcctcttcca tcgtgtcctt ctacgttccc 2220
ctggtgatca tggtcttcgt ctactccagg gtctttcagg aggccaaaag gcagctccag 2280
aagattgaca aatctgaggg ccgcttccat gtccagaacc ttagccaggt ggagcaggat 2340
gggcggacgg ggcatggact ccgcagatct tccaagttct gcttgaagga gcacaaagcc 2400
ctcaagacgt taggcatcat catgggcact ttcaccctct gctggctgcc cttcttcatc 2460
gttaacattg tgcatgtgat ccaggataac ctcatccgta aggaagttta catcctccta 2520
aattggatag gctatgtcaa ttctggtttc aatcccctta tctactgccg gagcccagat 2580
ttcaggattg ccttccagga gcttctgtgc ctgcgcaggt cttctttgaa ggcctatggg 2640
aatggctact ccagcaacgg caacacaggg gagcagagtg gatatcacgt ggaacaggag 2700
aaagaaaata aactgctgtg tgaagacctc ccaggcacgg aagactttgt gggccatcaa 2760
ggtactgtgc ctagcgataa cattgattca caagggagga attgtagtac aaatgactca 2820
ctgctgtaaa gcagtttttc tacttttaaa gacccccccc cccccaacag aacactaaac 2880
agactattta acttgagggt aataaactta gaataaaatt gtaaaaattg tatagagata 2940
tgcagaagga agggcatcct tctgcctttt ttatttttt aagctgtaaa aagagagaaa 3000
acttatttga gtgattattt gttatttgta cagttcagtt cctctttgca tggaatttgt 3060
aagtttatgt ctaaagagct ttagtcctag aggacctgag tctgctatat tttcatgact 3120
tttccatgta tctacctcac tattcaagta ttaggggtaa tatattgctg ctggtaattt 3180
gtatctgaag gagattttcc ttcctacacc cttggacttg aggattttga gtatctcgga 3240
cctttcagct gtgaacatgg actcttcccc cactcctctt atttgctcac acggggtatt 3300
ttaggcaggg atttgaggag cagcttcagt tgttttcccg agcaaaggtc taaagtttac 3360
agtaaataaa atgtttgacc atgccttcat tgcacctgtt tgtccaaaac cccttgactg 3420
gagtgctgtt gcctcccccа ctggaaaccg c 3451

<210> 3
<211> 3451
<212> DNA
<213> human genomic clone

<220>
<221> mutation
<222> (1)..(3451)
<223> variant of the human beta2-adrenergic receptor
gene with mutations in positions 1541,1633,1666

<400> 3
cccgggttca agagattctc ctgtctcagc ctcccgagta gctgggacta caggtacgtg 60
ccaccacacc tggctaattt ttgtattttt agtagagaca agagttacac catattggcc 120
aggatctttt gctttctata gcttcaaaat gttcttaatg ttaagacatt cttaatactc 180
tgaaccatat gaatttgcca ttttggtaag tcacagacgc cagatggtgg caatttcaca 240
tggcacaacc cgaaagatta acaaactatc cagcagatga aaggattttt tttagtttca 300
ttgggtttac tgaagaaatt gtttgaattc tcattgcatc tccagttcaa cagataatga 360
gtgagtgatg ccacactctc aagagttaaa aacaaaacaa caaaaaaatt aaaacaaaag 420
cacacaactt tctctctctg tcccaaaata catacttgca tacccccgct ccagataaaa 480
tccaaagggt aaaactgtct tcatgcctgc aaattcctaa ggagggcacc taaagtactt 540
gacagcgagt gtgctgagga aatcggcagc tgttgaagtc acctcctgtg ctcttgccaa 600
atgtttgaaa gggaatacac tgggttaccg ggtgtatgtt gggaggggag cattatcagt 660
gctcgggtga ggcaagttcg gagtacccag atggagacat ccgtgtctgt gtcgctctgg 720

atgcctccaa gccagcgtgt gtttactttc tgtgtgtgtc accatgtctt tgtgcttctg 780
ggtgcttctg tgtttgtttc tggccgcgtt tctgtgttgg acaggggtga ctttgtgccg 840
gatggcttct gtgtgagagc gcgcgcgagt gtgcatgtcg gtgagctggg agggtgtgtc 900
tcagtgtcta tggctgtggt tcggtataag tctgagcatg tctgccaggg tgtatttgtg 960
cctgtatgtg cgtgcctcgg tgggcactct cgtttccttc cgaatgtggg gcagtgccgg 1020
tgtgctgccc tctgccttga gacctcaagc cgcgcaggcg cccagggcag gcaggtagcg 1080
gccacagaag agccaaaagc tcccgggttg gctggtaagg acaccacctc cagctttagc 1140
cctctggggc cagccagggt agccgggaag cagtggtggc ccgccctcca gggagcagtt 1200
gggccccgcc cgggccagcc ccaggagaag gagggcgagg ggaggggagg gaaaggggag 1260
gagtgcctcg ccccttcgcg gctgccggcg tgccattggc cgaaagttcc cgtacgtcac 1320
ggcgagggca gttcccctaa agtcctgtgc acataacggg cagaacgcac tgcgaagcgg 1380
cttcttcaga gcacgggctg gaactggcag gcaccgcgag cccctagcac ccgacaagct 1440
gagtgtgcag gacgagtccc caccacaccc acaccacagc cgctgaatga ggcttccagg 1500
cgtccgctcg cggcccgcag agccccgccg tgggtccgcc cgctgaggcg cccccagcca 1560
gtgcgcttac ctgccagact gcgcgccatg gggcaacccg ggaacggcag cgccttcttg 1620
ctggcaccca atggaagcca tgcgccggac cacgacgtca cgcaggaaag ggacgaggtg 1680
tgggtggtgg gcatgggcat cgtcatgtct ctcatcgtcc tggccatcgt gtttggcaat 1740
gtgctggtca tcacagccat tgccaagttc gagcgtctgc agacggtcac caactacttc 1800
atcacttcac tggcctgtgc tgatctggtc atgggcctgg cagtggtgcc ctttggggcc 1860
gcccatattc ttatgaaaat gtggactttt ggcaacttct ggtgcgagtt ttggacttcc 1920
attgatgtgc tgtgcgtcac ggccagcatt gagaccctgt gcgtgatcgc agtggatcgc 1980
tactttgcca ttacttcacc tttcaagtac cagagcctgc tgaccaagaa taaggcccgg 2040
gtgatcattc tgatggtgtg gattgtgtca ggccttacct ccttcttgcc cattcagatg 2100
cactggtacc gggccaccca ccaggaagcc atcaactgct atgccaatga gacctgctgt 2160
gacttcttca cgaaccaagc ctatgccatt gcctcttcca tcgtgtcctt ctacgttccc 2220
ctggtgatca tggtcttcgt ctactccagg gtctttcagg aggccaaaag gcagctccag 2280
aagattgaca aatctgaggg ccgcttccat gtccagaacc ttagccaggt ggagcaggat 2340
gggcggacgg ggcatggact ccgcagatct tccaagttct gcttgaagga gcacaaagcc 2400
ctcaagacgt taggcatcat catgggcact ttcaccctct gctggctgcc cttcttcatc 2460
gttaacattg tgcatgtgat ccaggataac ctcatccgta aggaagttta catcctccta 2520
aattggatag gctatgtcaa ttctggtttc aatcccctta tctactgccg gagcccagat 2580
ttcaggattg ccttccagga gcttctgtgc ctgcgcaggt cttctttgaa ggcctatggg 2640
aatggctact ccagcaacgg caacacaggg gagcagagtg gatatcacgt ggaacaggag 2700
aaagaaaata aactgctgtg tgaagacctc ccaggcacgg aagactttgt gggccatcaa 2760
ggtactgtgc ctagcgataa cattgattca caagggagga attgtagtac aaatgactca 2820
ctgctgtaaa gcagtttttc tacttttaaa gacccccccc cccccaacag aacactaaac 2880
agactattta acttgagggt aataaactta gaataaaatt gtaaaaattg tatagagata 2940
tgcagaagga agggcatcct tctgcctttt ttatttttt aagctgtaaa aagagagaaa 3000
acttatttga gtgattattt gttatttgta cagttcagtt cctctttgca tggaatttgt 3060
aagtttatgt ctaaagagct ttagtcctag aggacctgag tctgctatat tttcatgact 3120
tttccatgta tctacctcac tattcaagta ttaggggtaa tatattgctg ctggtaattt 3180
gtatctgaag gagattttcc ttcctacacc cttggacttg aggattttga gtatctcgga 3240
cctttcagct gtgaacatgg actcttcccc cactcctctt atttgctcac acggggtatt 3300
ttaggcaggg atttgaggag cagcttcagt tgttttcccg agcaaaggtc taaagtttac 3360
agtaaataaa atgtttgacc atgccttcat tgcacctgtt tgtccaaaac cccttgactg 3420
gagtgctgtt gcctccccca ctggaaaccg c 3451

<210> 4
<211> 3451
<212> DNA
<213> human genomic clone

<220>
<221> mutation
<222> (1)..(3451)
<223> variant of the human beta2-adernergic receptor
gene with mutations in positions 1541,1633,1666

<400> 4
cccgggttca agagattctc ctgtctcagc ctcccgagta gctgggacta caggtacgtg 60
ccaccacacc tggctaattt ttgtattttt agtagagaca agagttacac catattggcc 120
aggatctttt gctttctata gcttcaaaat gttcttaatg ttaagacatt cttaatactc 180
tgaaccatat gaatttgcca ttttggtaag tcacagacgc cagatggtgg caatttcaca 240
tggcacaacc cgaaagatta acaaactatc cagcagatga aaggattttt tttagtttca 300
ttgggtttac tgaagaaatt gtttgaattc tcattgcatc tccagttcaa cagataatga 360
gtgagtgatg ccacactctc aagagttaaa aacaaaacaa caaaaaaatt aaaacaaaag 420
cacacaactt tctctctctg tcccaaaata catacttgca taccccgct ccagataaaa 480
tccaaagggt aaaactgtct tcatgcctgc aaattcctaa ggagggcacc taaagtactt 540
gacagcgagt gtgctgagga aatcggcagc tgttgaagtc acctcctgtg ctcttgccaa 600
atgtttgaaa gggaatacac tgggttaccg ggtgtatgtt gggaggggag cattatcagt 660
gctcgggtga ggcaagttcg gagtacccag atggagacat ccgtgtctgt gtcgctctgg 720
atgcctccaa gccagcgtgt gtttactttc tgtgtgtgtc accatgtctt tgtgcttctg 780
ggtgcttctg tgtttgtttc tggccgcgtt tctgtgttgg acaggggtga ctttgtgccg 840
gatggcttct gtgtgagagc gcgcgcgagt gtgcatgtcg gtgagctggg agggtgtgtc 900
tcagtgtcta tggctgtggt tcggtataag tctgagcatg tctgccaggg tgtatttgtg 960
cctgtatgtg cgtgcctcgg tgggcactct cgtttccttc cgaatgtggg gcagtgccgg 1020
tgtgctgccc tctgccttga gacctcaagc cgcgcaggcg cccagggcag gcaggtagcg 1080
gccacagaag agccaaaagc tcccgggttg gctggtaagg acaccacctc cagctttagc 1140
cctctggggc cagccagggt agccgggaag cagtggtggc ccgccctcca gggagcagtt 1200
gggccccgcc cgggccagcc ccaggagaag gagggcgagg ggaggggagg gaaaggggag 1260
gagtgcctcg ccccttcgcg gctgccggcg tgccattggc cgaaagttcc cgtacgtcac 1320
ggcgagggca gttcccctaa agtcctgtgc acataacggg cagaacgcac tgcgaagcgg 1380
cttcttcaga gcacgggctg gaactggcag gcaccgcgag cccctagcac ccgacaagct 1440
gagtgtgcag gacgagtccc caccacaccc acaccacagc cgctgaatga ggcttccagg 1500
cgtccgctcg cggcccgcag agccccgccg tgggtccgcc tgctgaggcg cccccagcca 1560
gtgcgcttac ctgccagact gcgcgccatg gggcaacccg ggaacggcag cgccttcttg 1620
ctggcaccca atggaagcca tgcgccggac cacgacgtca cgcagcaaag ggacgaggtg 1680
tgggtggtgg gcatgggcat cgtcatgtct ctcatcgtcc tggccatcgt gtttggcaat 1740
gtgctggtca tcacagccat tgccaagttc gagcgtctgc agacggtcac caactacttc 1800
atcacttcac tggcctgtgc tgatctggtc atgggcctgg cagtggtgcc ctttggggcc 1860
gcccatattc ttatgaaaat gtggactttt ggcaacttct ggtgcgagtt ttggacttcc 1920
attgatgtgc tgtgcgtcac ggccagcatt gagaccctgt gcgtgatcgc agtggatcgc 1980
tactttgcca ttacttcacc tttcaagtac cagagcctgc tgaccaagaa taaggcccgg 2040
gtgatcattc tgatggtgtg gattgtgtca ggccttacct ccttcttgcc cattcagatg 2100
cactggtacc gggccaccca ccaggaagcc atcaactgct atgccaatga gacctgctgt 2160

gacttcttca cgaaccaagc ctatgccatt gcctcttcca tcgtgtcctt ctacgttccc 2220
ctggtgatca tggtcttcgt ctactccagg gtctttcagg aggccaaaag gcagctccag 2280
aagattgaca aatctgaggg ccgcttccat gtccagaacc ttagccaggt ggagcaggat 2340
gggcggacgg ggcatggact ccgcagatct tccaagttct gcttgaagga gcacaaagcc 2400
ctcaagacgt taggcatcat catgggcact ttcaccctct gctggctgcc cttcttcatc 2460
gttaacattg tgcatgtgat ccaggataac ctcatccgta aggaagttta catcctccta 2520
aattggatag gctatgtcaa ttctggtttc aatcccctta tctactgccg gagcccagat 2580
ttcaggattg ccttccagga gcttctgtgc ctgcgcaggt cttctttgaa ggcctatggg 2640
aatggctact ccagcaacgg caacacaggg gagcagagtg gatatcacgt ggaacaggag 2700
aaagaaaata aactgctgtg tgaagacctc ccaggcacgg aagactttgt gggccatcaa 2760
ggtactgtgc ctagcgataa cattgattca caagggagga attgtagtac aaatgactca 2820
ctgctgtaaa gcagtttttc tacttttaaa gacccccccc cccccaacag aacactaaac 2880
agactattta acttgagggt aataaactta gaataaaatt gtaaaaattg tatagagata 2940
tgcagaagga agggcatcct tctgcctttt ttatttttt aagctgtaaa aagagagaaa 3000
acttatttga gtgattattt gttatttgta cagttcagtt cctctttgca tggaatttgt 3060
aagtttatgt ctaaagagct ttagtcctag aggacctgag tctgctatat tttcatgact 3120
tttccatgta tctacctcac tattcaagta ttaggggtaa tatattgctg ctggtaattt 3180
gtatctgaag gagattttcc ttcctacacc cttggacttg aggattttga gtatctcgga 3240
cctttcagct gtgaacatgg actcttcccc cactcctctt atttgctcac acggggtatt 3300
ttaggcaggg atttgaggag cagcttcagt tgttttcccg agcaaaggtc taaagtttac 3360
agtaaataaa atgtttgacc atgccttcat tgcacctgtt tgtccaaaac cccttgactg 3420
gagtgctgtt gcctcccccа ctggaaaccg c 3451

<210> 5
<211> 3451
<212> DNA
<213> human genomic clone

<220>
<221> mutation
<222> (1)..(3451)
<223> variant of the human beta2-adrenergic receptor
gene with mutations in positions
1541,1568,1633,1666

<400> 5
cccgggttca agagattctc ctgtctcagc ctcccgagta gctgggacta caggtacgtg 60
ccaccacacc tggctaattt ttgtattttt agtagagaca agagttacac catattggcc 120
aggatctttt gctttctata gcttcaaaat gttcttaatg ttaagacatt cttaatactc 180
tgaaccatat gaatttgcca ttttggtaag tcacagacgc cagatggtgg caatttcaca 240
tggcacaacc cgaaagatta acaaactatc cagcagatga aaggattttt tttagtttca 300
ttgggtttac tgaagaaatt gtttgaattc tcattgcatc tccagttcaa cagataatga 360
gtgagtgatg ccacactctc aagagttaaa aacaaaacaa caaaaaaatt aaaacaaaag 420
cacacaactt tctctctctg tcccaaaata catacttgca taccccgct ccagataaaa 480
tccaaagggt aaaactgtct tcatgcctgc aaattcctaa ggagggcacc taaagtactt 540
gacagcgagt gtgctgagga aatcggcagc tgttgaagtc acctcctgtg ctcttgccaa 600
atgtttgaaa gggaatacac tgggttaccg ggtgtatgtt gggaggggag cattatcagt 660

gctcgggtga ggcaagttcg gagtacccag atggagacat ccgtgtctgt gtcgctctgg 720
atgcctccaa gccagcgtgt gtttactttc tgtgtgtgtc accatgtctt tgtgcttctg 780
ggtgcttctg tgtttgtttc tggccgcgtt tctgtgttgg acaggggtga ctttgtgccg 840
gatggcttct gtgtgagagc gcgcgcgagt gtgcatgtcg gtgagctggg agggtgtgtc 900
tcagtgtcta tggctgtggt tcggtataag tctgagcatg tctgccaggg tgtatttgtg 960
cctgtatgtg cgtgcctcgg tgggcactct cgtttccttc cgaatgtggg gcagtgccgg 1020
tgtgctgccc tctgccttga gacctcaagc cgcgcaggcg cccagggcag gcaggtagcg 1080
gccacagaag agccaaaagc tcccgggttg gctggtaagg acaccacctc cagctttagc 1140
cctctggggc cagccagggt agccgggaag cagtggtggc ccgccctcca gggagcagtt 1200
gggccccgcc cgggccagcc ccaggagaag gagggcgagg ggaggggagg gaaaggggag 1260
gagtgcctcg ccccttcgcg gctgccggcg tgccattggc cgaaagttcc cgtacgtcac 1320
ggcgagggca gttcccctaa agtcctgtgc acataacggg cagaacgcac tgcgaagcgg 1380
cttcttcaga gcacgggctg gaactggcag gcaccgcgag cccctagcac ccgacaagct 1440
gagtgtgcag gacgagtccc caccacaccc acaccacagc cgctgaatga ggcttccagg 1500
cgtccgctcg cggcccgcag agccccgccg tgggtccgcc tgctgaggcg cccccagcca 1560
gtgcgcttac ctgccagact gcgcgccatg gggcaacccg ggaacggcag cgccttcttg 1620
ctggcaccca atagaagcca tgcgccggac cacgacgtca cgcagcaaag ggacgaggtg 1680
tgggtggtgg gcatgggcat cgtcatgtct ctcatcgtcc tggccatcgt gtttggcaat 1740
gtgctggtca tcacagccat tgccaagttc gagcgtctgc agacggtcac caactacttc 1800
atcacttcac tggcctgtgc tgatctggtc atgggcctgg cagtggtgcc ctttggggcc 1860
gcccatattc ttatgaaaat gtggactttt ggcaacttct ggtgcgagtt ttggacttcc 1920
attgatgtgc tgtgcgtcac ggccagcatt gagaccctgt gcgtgatcgc agtggatcgc 1980
tactttgcca ttacttcacc tttcaagtac cagagcctgc tgaccaagaa taaggcccgg 2040
gtgatcattc tgatggtgtg gattgtgtca ggccttacct ccttcttgcc cattcagatg 2100
cactggtacc gggccaccca ccaggaagcc atcaactgct atgccaatga gacctgctgt 2160
gacttcttca cgaaccaagc ctatgccatt gcctcttcca tcgtgtcctt ctacgttccc 2220
ctggtgatca tggtcttcgt ctactccagg gtctttcagg aggccaaaag gcagctccag 2280
aagattgaca aatctgaggg ccgcttccat gtccagaacc ttagccaggt ggagcaggat 2340
gggcggacgg ggcatggact ccgcagatct tccaagttct gcttgaagga gcacaaagcc 2400
ctcaagacgt taggcatcat catgggcact ttcaccctct gctggctgcc cttcttcatc 2460
gttaacattg tgcatgtgat ccaggataac ctcatccgta aggaagttta catcctccta 2520
aattggatag gctatgtcaa ttctggtttc aatcccctta tctactgccg gagcccagat 2580
ttcaggattg ccttccagga gcttctgtgc ctgcgcaggt cttctttgaa ggcctatggg 2640
aatggctact ccagcaacgg caacacaggg gagcagagtg gatatcacgt ggaacaggag 2700
aaagaaaata aactgctgtg tgaagacctc ccaggcacgg aagactttgt gggccatcaa 2760
ggtactgtgc ctagcgataa cattgattca caagggagga attgtagtac aaatgactca 2820
ctgctgtaaa gcagtttttc tacttttaaa gacccccccc cccccaacag aacactaaac 2880
agactattta acttgagggt aataaactta gaataaaatt gtaaaaattg tatagagata 2940
tgcagaagga agggcatcct tctgcctttt ttatttttt aagctgtaaa aagagagaaa 3000
acttatttga gtgattattt gttatttgta cagttcagtt cctctttgca tggaatttgt 3060
aagtttatgt ctaaagagct ttagtcctag aggacctgag tctgctatat tttcatgact 3120
tttccatgta tctacctcac tattcaagta ttaggggtaa tatattgctg ctggtaattt 3180
gtatctgaag gagattttcc ttcctacacc cttggacttg aggattttga gtatctcgga 3240
cctttcagct gtgaacatgg actcttcccc cactcctctt atttgctcac acggggtatt 3300
ttaggcaggg atttgaggag cagcttcagt tgttttcccg agcaaaggtc taaagtttac 3360
agtaaataaa atgtttgacc atgccttcat tgcacctgtt tgtccaaaac cccttgactg 3420
gagtgctgtt gcctccccca ctggaaaccg c 3451

<210> 6
<211> 3451
<212> DNA
<213> human genomic clone

<220>
<221> mutation
<222> (1)..(3451)
<223> variant of the human beta2-adrenergic receptor
gene with mutations in positions
1541,1568,1633,1666

<400> 6
cccgggttca agagattctc ctgtctcagc ctcccgagta gctgggacta caggtacgtg 60
ccaccacacc tggctaattt ttgtattttt agtagagaca agagttacac catattggcc 120
aggatctttt gctttctata gcttcaaaat gttcttaatg ttaagacatt cttaatactc 180
tgaaccatat gaatttgcca ttttggtaag tcacagacgc cagatggtgg caatttcaca 240
tggcacaacc cgaaagatta acaaactatc cagcagatga aaggattttt tttagtttca 300
ttgggtttac tgaagaaatt gtttgaattc tcattgcatc tccagttcaa cagataatga 360
gtgagtgatg ccacactctc aagagttaaa aacaaaacaa caaaaaaatt aaaacaaaag 420
cacacaactt tctctctctg tcccaaaata catacttgca taccccgct ccagataaaa 480
tccaaagggt aaaactgtct tcatgcctgc aaattcctaa ggagggcacc taaagtactt 540
gacagcgagt gtgctgagga aatcggcagc tgttgaagtc acctcctgtg ctcttgccaa 600
atgtttgaaa gggaatacac tgggttaccg ggtgtatgtt gggaggggag cattatcagt 660
gctcgggtga ggcaagttcg gagtacccag atggagacat ccgtgtctgt gtcgctctgg 720
atgcctccaa gccagcgtgt gtttactttc tgtgtgtgtc accatgtctt tgtgcttctg 780
ggtgcttctg tgtttgtttc tggccgcgtt tctgtgttgg acaggggtga ctttgtgccg 840
gatggcttct gtgtgagagc gcgcgcgagt gtgcatgtcg gtgagctggg agggtgtgtc 900
tcagtgtcta tggctgtggt tcggtataag tctgagcatg tctgccaggg tgtatttgtg 960
cctgtatgtg cgtgcctcgg tgggcactct cgtttccttc cgaatgtggg gcagtgccgg 1020
tgtgctgccc tctgccttga gacctcaagc cgcgcaggcg cccagggcag gcaggtagcg 1080
gccacagaag agccaaaagc tcccgggttg gctggtaagg acaccacctc cagctttagc 1140
cctctggggc cagccagggt agccgggaag cagtggtggc ccgccctcca gggagcagtt 1200
gggccccgcc cgggccagcc ccaggagaag gagggcgagg ggaggggagg gaaaggggag 1260
gagtgcctcg ccccttcgcg gctgccggcg tgccattggc cgaaagttcc cgtacgtcac 1320
ggcgagggca gttcccctaa agtcctgtgc acataacggg cagaacgcac tgcgaagcgg 1380
cttcttcaga gcacgggctg gaactggcag gcaccgcgag cccctagcac ccgacaagct 1440
gagtgtgcag gacgagtccc caccacaccc acaccacagc cgctgaatga ggcttccagg 1500
cgtccgctcg cggcccgcag agccccgccg tgggtccgcc cgctgaggcg cccccagcca 1560
gtgcgctcac ctgccagact gcgcgccatg gggcaacccg ggaacggcag cgccttcttg 1620
ctggcaccca atggaagcca tgcgccggac cacgacgtca cgcaggaaag ggacgaggtg 1680
tgggtggtgg gcatgggcat cgtcatgtct ctcatcgtcc tggccatcgt gtttggcaat 1740
gtgctggtca tcacagccat tgccaagttc gagcgtctgc agacggtcac caactacttc 1800
atcacttcac tggcctgtgc tgatctggtc atgggcctgg cagtggtgcc ctttggggcc 1860
gcccatattc ttatgaaaat gtggactttt ggcaacttct ggtgcgagtt ttggacttcc 1920
attgatgtgc tgtgcgtcac ggccagcatt gagaccctgt gcgtgatcgc agtggatcgc 1980
tactttgcca ttacttcacc tttcaagtac cagagcctgc tgaccaagaa taaggcccgg 2040

gtgatcattc tgatggtgtg gattgtgtca ggccttacct ccttcttgcc cattcagatg 2100
cactggtacc gggccaccca ccaggaagcc atcaactgct atgccaatga gacctgctgt 2160
gacttcttca cgaaccaagc ctatgccatt gcctcttcca tcgtgtcctt ctacgttccc 2220
ctggtgatca tggtcttcgt ctactccagg gtctttcagg aggccaaaag gcagctccag 2280
aagattgaca aatctgaggg ccgcttccat gtccagaacc ttagccaggt ggagcaggat 2340
gggcggacgg ggcatggact ccgcagatct tccaagttct gcttgaagga gcacaaagcc 2400
ctcaagacgt taggcatcat catgggcact ttcaccctct gctggctgcc cttcttcatc 2460
gttaacattg tgcatgtgat ccaggataac ctcatccgta aggaagttta catcctccta 2520
aattggatag gctatgtcaa ttctggtttc aatcccctta tctactgccg gagcccagat 2580
ttcaggattg ccttccagga gcttctgtgc ctgcgcaggt cttctttgaa ggcctatggg 2640
aatggctact ccagcaacgg caacacaggg gagcagagtg gatatcacgt ggaacaggag 2700
aaagaaaata aactgctgtg tgaagacctc ccaggcacgg aagactttgt gggccatcaa 2760
ggtactgtgc ctagcgataa cattgattca caagggagga attgtagtac aaatgactca 2820
ctgctgtaaa gcagtttttc tacttttaaa gacccccccc cccccaacag aacactaaac 2880
agactattta acttgagggt aataaactta gaataaaatt gtaaaaattg tatagagata 2940
tgcagaagga agggcatcct tctgcctttt ttatttttt aagctgtaaa aagagagaaa 3000
acttatttga gtgattattt gttatttgta cagttcagtt cctctttgca tggaatttgt 3060
aagtttatgt ctaaagagct ttagtcctag aggacctgag tctgctatat tttcatgact 3120
tttccatgta tctacctcac tattcaagta ttaggggtaa tatattgctg ctggtaattt 3180
gtatctgaag gagattttcc ttcctacacc cttggacttg aggattttga gtatctcgga 3240
cctttcagct gtgaacatgg actcttcccc cactcctctt atttgctcac acggggtatt 3300
ttaggcaggg atttgaggag cagcttcagt tgttttcccg agcaaaggtc taaagtttac 3360
agtaaataaa atgtttgacc atgccttcat tgcacctgtt tgtccaaaac cccttgactg 3420
gagtgctgtt gcctccccca ctggaaaccg c 3451

<210> 7
<211> 3451
<212> DNA
<213> human genomic clone

<220>
<221> mutation
<222> (1)..(3451)
<223> variant of the human beta2- adrenergic receptor
gene with mutations in positions
1541,1568,1633,1666

<400> 7
cccgggttca agagattctc ctgtctcagc ctcccgagta gctgggacta caggtacgtg 60
ccaccacacc tggctaattt ttgtattttt agtagagaca agagttacac catattggcc 120
aggatctttt gctttctata gcttcaaaat gttcttaatg ttaagacatt cttaatactc 180
tgaaccatat gaatttgcca ttttggtaag tcacagacgc cagatggtgg caatttcaca 240
tggcacaacc cgaaagatta acaaactatc cagcagatga aaggattttt tttagtttca 300
ttgggtttac tgaagaaatt gtttgaattc tcattgcatc tccagttcaa cagataatga 360
gtgagtgatg ccacactctc aagagttaaa aacaaaacaa caaaaaaatt aaaacaaaag 420
cacacaactt tctctctctg tcccaaaata catacttgca taccccgct ccagataaaa 480
tccaaagggt aaaactgtct tcatgcctgc aaattcctaa ggagggcacc taaagtactt 540

gacagcgagt gtgctgagga aatcggcagc tgttgaagtc acctcctgtg ctcttgccaa 600
atgtttgaaa gggaatacac tgggttaccg ggtgtatgtt gggaggggag cattatcagt 660
gctcgggtga ggcaagttcg gagtacccag atggagacat ccgtgtctgt gtcgctctgg 720
atgcctccaa gccagcgtgt gtttactttc tgtgtgtgtc accatgtctt tgtgcttctg 780
ggtgcttctg tgtttgtttc tggccgcgtt tctgtgttgg acaggggtga ctttgtgccg 840
gatggcttct gtgtgagagc gcgcgcgagt gtgcatgtcg gtgagctggg agggtgtgtc 900
tcagtgtcta tggctgtggt tcggtataag tctgagcatg tctgccaggg tgtatttgtg 960
cctgtatgtg cgtgcctcgg tgggcactct cgtttccttc cgaatgtggg gcagtgccgg 1020
tgtgctgccc tctgccttga gacctcaagc cgcgcaggcg cccagggcag gcaggtagcg 1080
gccacagaag agccaaaagc tcccgggttg gctggtaagg acaccacctc cagctttagc 1140
cctctggggc cagccagggt agccgggaag cagtggtggc ccgccctcca gggagcagtt 1200
gggccccgcc cgggccagcc ccaggagaag gagggcgagg ggaggggagg gaaaggggag 1260
gagtgcctcg ccccttcgcg gctgccggcg tgccattggc cgaaagttcc cgtacgtcac 1320
ggcgagggca gttcccctaa agtcctgtgc acataacggg cagaacgcac tgcgaagcgg 1380
cttcttcaga gcacgggctg gaactggcag gcaccgcgag cccctagcac ccgacaagct 1440
gagtgtgcag gacgagtccc caccacaccc acaccacagc cgctgaatga ggcttccagg 1500
cgtccgctcg cggcccgcag agccccgccg tgggtccgcc tgctgaggcg cccccagcca 1560
gtgcgcttac ctgccagact gcgcgccatg gggcaacccg ggaacggcag cgccttcttg 1620
ctggcaccca atggaagcca tgcgccggac cacgacgtca cgcagcaaag ggacgaggtg 1680
tgggtggtgg gcatgggcat cgtcatgtct ctcatcgtcc tggccatcgt gtttggcaat 1740
gtgctggtca tcacagccat tgccaagttc gagcgtctgc agacggtcac caactacttc 1800
atcacttcac tggcctgtgc tgatctggtc atgggcctgg cagtggtgcc ctttggggcc 1860
gcccatattc ttatgaaaat gtggactttt ggcaacttct ggtgcgagtt ttggacttcc 1920
attgatgtgc tgtgcgtcac ggccagcatt gagaccctgt gcgtgatcgc agtggatcgc 1980
tactttgcca ttacttcacc tttcaagtac cagagcctgc tgaccaagaa taaggcccgg 2040
gtgatcattc tgatggtgtg gattgtgtca ggccttacct ccttcttgcc cattcagatg 2100
cactggtacc gggccaccca ccaggaagcc atcaactgct atgccaatga gacctgctgt 2160
gacttcttca cgaaccaagc ctatgccatt gcctcttcca tcgtgtcctt ctacgttccc 2220
ctggtgatca tggtcttcgt ctactccagg gtctttcagg aggccaaaag gcagctccag 2280
aagattgaca aatctgaggg ccgcttccat gtccagaacc ttagccaggt ggagcaggat 2340
gggcggacgg ggcatggact ccgcagatct tccaagttct gcttgaagga gcacaaagcc 2400
ctcaagacgt taggcatcat catgggcact ttcaccctct gctggctgcc cttcttcatc 2460
gttaacattg tgcatgtgat ccaggataac ctcatccgta aggaagttta catcctccta 2520
aattggatag gctatgtcaa ttctggtttc aatcccctta tctactgccg gagcccagat 2580
ttcaggattg ccttccagga gcttctgtgc ctgcgcaggt cttctttgaa ggcctatggg 2640
aatggctact ccagcaacgg caacacaggg gagcagagtg gatatcacgt ggaacaggag 2700
aaagaaaata aactgctgtg tgaagacctc ccaggcacgg aagactttgt gggccatcaa 2760
ggtactgtgc ctagcgataa cattgattca caagggagga attgtagtac aaatgactca 2820
ctgctgtaaa gcagtttttc tacttttaaa gacccccccc cccccaacag aacactaaac 2880
agactattta acttgagggt aataaactta gaataaaatt gtaaaaattg tatagagata 2940
tgcagaagga agggcatcct tctgcctttt ttatttttt aagctgtaaa aagagagaaa 3000
acttatttga gtgattattt gttatttgta cagttcagtt cctctttgca tggaatttgt 3060
aagtttatgt ctaaagagct ttagtcctag aggacctgag tctgctatat tttcatgact 3120
tttccatgta tctacctcac tattcaagta ttaggggtaa tatattgctg ctggtaattt 3180
gtatctgaag gagattttcc ttcctacacc cttggacttg aggattttga gtatctcgga 3240
cctttcagct gtgaacatgg actcttcccc cactcctctt atttgctcac acggggtatt 3300
ttaggcaggg atttgaggag cagcttcagt tgttttcccg agcaaaggtc taaagtttac 3360
agtaaataaa atgtttgacc atgccttcat tgcacctgtt tgtccaaaac cccttgactg 3420

gagtgctgtt gcctccccca ctggaaaccg c 3451